

Abstract

Fuel Cell Having Interdigitated Flow Channels and Water Transport Plates

5 The present invention is a fuel cell power plant that includes a
fuel cell having a membrane electrode assembly (MEA), which is
disposed between an anode support plate and a cathode support
plate, and porous water transport plates adjacent the anode and
cathode support plates. The porous water transport plates have
interdigitated flow channels for the reactant gas streams to pass
10 therethrough and conventional flow channels for a coolant stream to
pass therethrough. The fuel cell power plant also has means for
creating a pressure differential between the reactant gas streams and
the coolant stream such that the pressure of the reactant gas
streams is greater than the coolant stream. Incorporating the
15 interdigitated flow channels into the porous water transport plates
and operating the fuel cell at a pressure differential allows the coolant
water to saturate the water transport plates thereby forcing the
reactant gases into the anode and cathode support plate. This, in
turn, increases the mass transfer of such gases into the support
20 plates, thereby increasing the electrical performance of the fuel cell.
Current densities of about 1.6 amps per square meter are achieved
with air stoichiometries of not over 2.50.